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capital letters is well enough, even though the names have been derived from proper names; but, if we say it is a choice specimen of *Begonia Rex*, the case is different. The word 'begonia' now becomes a part of the scientific name of a species of plant. In the same manner the stately magnolia may be *Magnolia glauca* or *M. grandiflora*.

Science does not use emphatic type for the scientific names of genera or species, and doubtless for good reasons. I should like to learn what views the editor and other authorities in scientific nomenclature hold on the above subject. BYRON D. HALSTED.

New York, Dec. 31, 1883.

[We do not agree with our correspondent in his estimate of the value of the scientific names of plants and animals. They are a simple convenience, and have no higher value; and the use of italics for their proper mission — that of emphasis, or as catch-words — is lost if the page bristles with italics having other meaning.]

The skidor in the United States.

In *Science*, No. 44, mention is made, in Nordenskiöld's account of the Greenland inland ice, of the 'skidor,' or Norwegian snow-shoe. It may be interesting to your readers to know that it is the snow-shoe most commonly used in Colorado. It is much preferred to the Canadian or web snow-shoe, and in the mountains in winter is often the only means of getting about from place to place — as from the mines on the mountains to the towns, and from one small mining town to another — when there is not enough travel to keep a road open through the deep snow. I know of one case in which a daily mail is carried twenty-five miles on snow-shoes; two men having the route, each making a single trip in a day, but going in opposite directions. The motion can hardly be called 'running,' as it is in the footnote on p. 737, as the shoes are not lifted from the surface of the snow at all, but slid forward at each step, the foot being raised slightly at the heel as in commencing a step in ordinary walking. The shoes that I have seen are from six to eight feet long, and about four inches wide. A pole about seven feet long is used as a guide and support, especially in sliding down hill, when a tremendous pace is often attained on a long slope. E. R. WARREN.

Colorado Springs, Jan. 1.

Standard thermometers.

In your editorial in this week's *Science* you quote the report of the chief signal-officer of the army, implying that a sensible difference exists between the theoretical standard thermometer adopted by this observatory and that of the International committee of weights and measures, and that the signal-service of the army has adopted a new standard thermometer more nearly agreeing with the latter.

I should be very greatly obliged to the chief signal-officer if he will anticipate the regular course of publication of the scientific work of his office, and give to the scientific public the results, at least, of the work from which it is concluded that the signal-service of the army has reached a nearer approximation to the standard thermometer of the International committee.

I have no doubt that there is a small difference between the standard air thermometer and the particular mercurial standard adopted by this observatory as its practical representative, at points distant from the freezing and boiling points; but, as our own standard has never been compared with any air standard in the possession of the signal-service of the army, I shall be quite interested to see the work by which it is concluded that there exists a sensible difference between the two. LEONARD WALDO.

Dec. 31, 1883.

Romalea microptera.

In 1879, in Alabama, I had many opportunities for observing the habits of the 'lubber grasshopper;' and, if my memory serves me, my observation showed that the hissing referred to by Capt. Shufeldt (*Science*, ii., 813) is due in large part to the forcible expulsion of air from the thoracic spiracles. It was always noticed on the occasions referred to by him, but at no other time. W. T.

Synchronism of geological formations.

I cannot agree with Professor Heilprin in the line of argument adopted in his letter to *Science* of Dec. 21, based, as it mainly is, on the assumed non-occurrence of 'evidence of inversion.' Professor Heilprin asks, "Why has it just so happened that a fauna characteristic of a given period has *invariably* succeeded one which, when the two are in superposition all over the world (so far as we are aware), indicates precedence in creation or origination, and *never* one that can be shown to be of a later birth?"

In reply I would say, that some years previous to Professor Huxley's address on this subject, Barrande, in his 'Système Silurien de la Bohême,' had shown such evidences of inversion to exist in the Silurian formation of Bohemia; and though many geologists and paleontologists disagreed with Barrande at that time, as to his theory of 'colonies' by which to account for the facts, yet none could dispute the facts cited by him. If we now turn to the old red sandstone of Scotland, we find still further evidences of inversion of like kind; for, while the crustacean genus Pterygotus, common to both the upper Silurian and lower old red sandstone, has been recently found also high up in the middle series of this formation, the carboniferous limestone shells, Productus giganteus, P. punctatus, Spirifer lineatus, and others, have been found in the old red sandstone far below the fish genera Pterichthys and Holoptychius, so characteristic of the upper old red division. Though there appears to be no reason why such instances of inversion should not have occurred over and over again, one can readily understand why, through the imperfection of the geological record, and the comparatively small fraction of the earth's surface which has been systematically examined, their occurrence is almost unknown.

With reference to the doctrine of migration, I judge, that, from Professor Heilprin's argument, we look at the matter from two different stand-points. He apparently takes no account of the generally accepted view of biologists, that, while organic development has been closely similar in all parts of the world, the rate at which it proceeded has varied within the widest limits, even in adjacent regions. I cannot help looking on the various formations as the records of that development; and, judging of the past distribution of life on the earth from what we at present see before us, I am forced to believe that identity of organic contents in widely separated strata, instead of being evidence of chronological contemporaneity, is exactly the reverse.

Instead of encroaching further on your valuable space, I would refer to Prof. A. Geikie, who, in the current issue of the Encyclopaedia Britannica (9th

edition, subject geology, part 5), gives exactly that view of the matter which I consider the logical basis on which Professor Huxley rested his argument, and which recent researches have in no way tended to upset. E. NUGENT.

Pottstown, Dec. 27, 1883.

SIR CHARLES WILLIAM SIEMENS.

CARL WILHELM SIEMENS died in London on the 20th of November last, at the age of sixty. This distinguished man, better known to the people of Great Britain and the United States as Charles William Siemens, one of eight sons of Ferdinand Siemens, was born at Lenthe, near Hannover, April 4, 1823. He was one of a family of men of science several of whom have become well known by their success in the invention and introduction of improvements and modification of standard methods of engineering and metallurgical work. Among these, his brother, Ernst Werner Siemens, is the most famous. The two brothers have worked together, with frequent assistance from a younger brother, Friedrich, in nearly every field of applied science. They have been most successful in the departments of metallurgy and electricity.

The elder brother, Ernst, entered the army of Prussia, joining the artillery; and Carl was sent to the University of Göttingen. Carl received his preparatory education at the Gymnasium of Lübeck and in the Art school of Magdeburg, near what was formerly the home of Otto von Guericke. After graduation from the university, he entered the Stolberg engineering-works, in 1842, as an apprentice, but remained only a year, leaving for the purpose of going to London to patent and introduce his first invention, the 'differential governor' for steam-engines, and a method of silvering devised by his brother Ernst. He settled in London, opening an office as civil engineer, and making that city his home, becoming 'naturalized' in 1849, but frequently visiting Germany to meet his brothers, who finally joined him in business.

In 1846 the brothers began the study of methods of economizing in the use of fuel in metallurgical operations demanding high temperatures; and the result of their labors, in course of time, was seen in the invention of the Siemens regenerative furnace, — an invention which has since revolutionized the methods of production of steel and of heating iron, and which is still modifying all the industrial operations dependent upon the attainment of maximum heat in furnaces; such as the manufacture of glass, and the reduction of ores of zinc and other 'useful' metals. In 1849 the brothers William and Werner, as they came to be called, attracted the attention of all who were interested in the applications of science by the announcement of their invention of a method of 'anastatic printing,' modifications of which have now become generally introduced for the production of the simpler kinds of line-engravings. This invention greatly interested Professor Faraday, and he was very soon sufficiently well convinced of its value to volunteer to describe it in a lecture before the Royal institution. His helpful aid was one of the most effective means of making the talented young inventors known and of giving them a start in a career bringing them continually increasing fame.

Siemens next turned his attention to the newly announced dynamical theory of heat, and in 1847 adapted a 'regenerator' to a superheated steam-engine. Modifications of the governor for controlling the motion of clock-work were proposed by him at nearly the same time, and his 'chronometric governor' has been long in use on the instruments of the Greenwich observatory. In 1851 he brought out his water-meter, — an instrument in which was a screw with its recording or indicating mechanism sealed in a chamber having a glass window, through which the readings could be made, and so free from friction that it gave most accurate measures of the flow. The regenerative furnace now began to take such shape that the brothers found it to their interest to devote their attention to that; and in 1856 they worked the invention into such form that they could see in it the promise of complete success. By the year 1861 they had patented some of its most essential features. The inventors succeeded in raising the necessary capital, and erected their furnace in works at Birmingham in 1866, and made steel by their process, which was exhibited at Paris at the international exhibition of the following year. The primary object held in view by the inventors was the manufacture of steel directly from the ore. In this they were less successful than in the making of the steel by mixture of wrought-iron scrap with cast iron on the hearth of their reverberatory furnace. This last-named process has become a well-known method of producing the soft ingot-irons misnamed steels, 'mild' or 'low' steels, which materials are now so exclusively adopted by many makers of steam-boilers and of rails. Such steel is steadily driving puddled iron from the market: it is called, sometimes 'Siemens,' and often 'Siemens-Martin' steel; the first attempts to manufacture steel by this method having been